



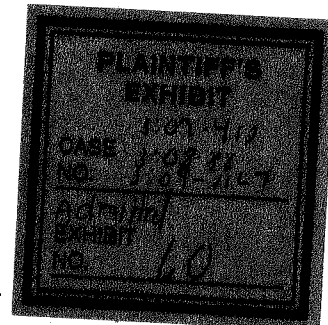
## Engineers and Environmental Consultants

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July 29, 2009

Mr. James Crawford  
Patriot Coal Corporation  
PO Box 1233  
Charleston, West Virginia 25324

RE: Letter Report - Selenium Remediation Liability Cost  
Estimate for Magnum Coal Company Operations  
Project No. 0101-08-0637



Dear Mr. Crawford:

Potesta & Associates, Inc. (POTESTA) appreciates the opportunity to provide a selenium liability cost estimate associated with Patriot Coal Corporation's (Patriot) acquisition of Magnum Coal Company (Magnum).

Patriot acquired the assets of Magnum on July 23, 2008. Included in the acquisition were several operating surface and deep mine facilities in southern West Virginia. These operations included Apogee Coal Company, Catenary Coal Company, Coyote Coal Company, Midland Trail Energy, Remington Coal Company, Hobet Mining Company, Jupiter Coal Company, and Panther Coal Company. These operations are regulated by the West Virginia Department of Environmental Protection (WVDEP), Division of Mining and Reclamation. Water discharges from the mining operations are regulated under West Virginia's National Pollutant Discharge Elimination System (NPDES) which requires that discharges be monitored on at least a monthly basis. The Magnum operations required to monitor and achieve compliance for selenium in their water discharges are Jupiter Coal Company, Panther Coal Company, Hobet Mining Company, Apogee Coal Company, Catenary Coal Company, and Midland Trail Energy.

Patriot requested that POTESTA prepare an estimate of the costs to remediate selenium exceedances in order to meet the requirements of court orders, consent decrees and Magnum's permits. The United States Environmental Protection Agency and the State of West Virginia are currently considering revisions to selenium water quality standards which are expected to increase the allowable effluent levels from the current 4.7 parts per billion. This cost estimate has been prepared considering the dynamics of current legislation, capabilities of currently available technology and the Company's planned remediation strategy. Installation of treatment systems, as detailed in this valuation, at each of the 78 identified outlets should prevent any enforcement actions under court orders, consent decrees and permits. POTESTA believes that water treatment could be required in perpetuity if there are no changes to the current compliance standards.

POTESTA is familiar with the Magnum operations as a result of historically completing projects related to Magnum operations. Some of these projects included evaluation of mine water discharges containing selenium. Additionally, POTESTA relied on our engineering and previous experience with similar projects.

**POTESTA & ASSOCIATES, INC.**

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A3CON-000055

Mr. James Crawford

July 29, 2009

Page 2

Find attached tables summarizing the selenium remediation liability cost estimate for the Magnum operations.

#### **TREATMENT TECHNOLOGY**

The Zero Valent Iron (ZVI) treatment system is currently the best available treatment technology for reducing selenium levels. Though ZVI treatment technology is effective on a small scale, the effectiveness and practicality have not been demonstrated on a scale required by coal mining operations that treat extremely large volumes of storm water runoff.

#### **OUTLETS REQUIRING TREATMENT**

The outlets requiring treatment systems and the priority of implementing treatment systems are provided in Table 1 and were based on review of Magnum operation's 2007 and 2008 NPDES Discharge Monitoring Reports (DMR) obtained from the WVDEP and POTESTA's knowledge of Magnum operations.

#### **TREATMENT SYSTEM AND OPERATING COST**

Tables 2 and 3 summarize the actual operating costs required to implement several ZVI treatment systems currently installed at Hobet, Catenary, and Appogee. POTESTA believes that these costs represent a reasonable cost basis for the installation of future systems.

#### **SELENIUM REMEDIATION LIABILITY COST ESTIMATE**

The cost to remediate selenium was estimated at \$390,719,470 gross (adjusted for inflation) or \$85,155,374 expressed as a present worth cost. Based on the current state and federal regulatory requirements imposed and implemented under the West Virginia NPDES program and the current best available remediation technology, POTESTA believes that this estimate is reasonable.

Respectfully submitted,

POTESTA & ASSOCIATES, INC.

*D. Mark Kiser*

D. Mark Kiser, P.E.  
Chief Engineer

*William F. Drinkard III*

William F. Drinkard III, P.E.  
Senior Engineer

DMK:WFD:clr  
Enclosures

 **POTESTA**

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[illegible]

13%

**THE**

**Growth**

[illegible]

**Gross**

S. No	Condition	Permit No.	Outfall	Jul-09			Aug-09			Sep-09			Oct-09			Nov-09			Dec-09			1st quarter 2010		
				Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total
1	Favorable	WV101359	1		28,825	28,825		28,825	28,825		28,825	28,825		28,825	28,825		28,825	28,825		28,825	28,825		88,774	88,774
2	Adverse	WV101359	2		0	0		0	0		0	0		0	0		0	0		0	0		0	0
3	Adverse	WV101359	3		0	0		0	0		0	0		0	0		0	0		0	0		0	0
4	Adverse	WV009652	1		8,264	8,264		8,264	8,264		8,264	8,264		8,264	8,264		8,264	8,264		8,264	8,264		24,793	24,793
78				0	70,246	708,813	111,587	818,390	471,298	138,005	609,303	708,813	182,888	891,701	471,298	188,416	659,714	708,813	182,888	891,701	1,884,728	731,363	2,616,091	
	Initial			0	14,848	150,284	23,237	173,521	193,268	27,264	200,532	220,802	38,513	259,045	257,510	38,513	297,523	316,036	354,539	1,011,073	173,224	1,184,297		
	net of tax			0	55,300	55,300	558,429	87,820	646,249	370,663	165,841	536,504	679,465	120,369	800,834	370,663	133,371	934,235	658,429	182,888	841,317	558,140	1,409,457	

Gross

Entry	In Condition Permit No. Outfit	2nd quarter 2010			3rd quarter 2010			4th quarter 2010			1st quarter 2011			2nd quarter 2011			3rd quarter 2011			4th quarter 2011		
		Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total
ee	Favorable	1	86,774	86,774	1	86,774	86,774	1	86,774	86,774	1	86,774	86,774	1	86,774	86,774	1	86,774	86,774	1	86,774	86,774
	Adverse	2	24,793	24,793	2	24,793	24,793	2	24,793	24,793	2	24,793	24,793	2	24,793	24,793	2	24,793	24,793	2	24,793	24,793
	Adverse	3	403,705	403,705	3	403,705	403,705	3	403,705	403,705	3	403,705	403,705	3	403,705	403,705	3	403,705	403,705	3	403,705	403,705
	Adverse	1	24,793	24,793	1	24,793	24,793	1	24,793	24,793	1	24,793	24,793	1	24,793	24,793	1	24,793	24,793	1	24,793	24,793
		76	2,182,532	2,182,532	76	2,182,532	2,182,532	76	2,182,532	2,182,532	76	2,182,532	2,182,532	76	2,182,532	2,182,532	76	2,182,532	2,182,532	76	2,182,532	2,182,532
	taxes		512,214	512,214		512,214	512,214		512,214	512,214		512,214	512,214		512,214	512,214		512,214	512,214		512,214	512,214
	net of tax		680,581	680,581		680,581	680,581		680,581	680,581		680,581	680,581		680,581	680,581		680,581	680,581		680,581	680,581
			1,850,318	1,850,318		1,850,318	1,850,318		1,850,318	1,850,318		1,850,318	1,850,318		1,850,318	1,850,318		1,850,318	1,850,318		1,850,318	1,850,318

Gross

[illegible]

Year	No. Conditions	Permit No.	Order's	2016			2017			2018			2019			2020			2021			2022		
				Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total
10	Favorable	WV101359	1		347,087	347,087		347,087	347,087		347,087	347,087		347,087	347,087		347,087	347,087		347,087	347,087		347,087	347,087
	Adverse	WV101359	2		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171
	Adverse	WV101359	3		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171
	Adverse	WV000652	1		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171
			78	0	7,983,229	7,983,229	0	7,983,229	7,983,229	0	7,983,229	7,983,229	0	7,983,229	7,983,229	0	7,983,229	7,983,229	0	7,983,229	7,983,229	0	7,983,229	7,983,229
	Less:			0	2,011,774	2,011,774	0	2,011,774	2,011,774	0	2,011,774	2,011,774	0	2,011,774	2,011,774	0	2,011,774	2,011,774	0	2,011,774	2,011,774	0	2,011,774	2,011,774
	net of tax			0	5,971,455	5,971,455	0	5,971,455	5,971,455	0	5,971,455	5,971,455	0	5,971,455	5,971,455	0	5,971,455	5,971,455	0	5,971,455	5,971,455	0	5,971,455	5,971,455

Gross



Srvy. No.	Consolidated Permit No.	Outfall & System	2003			2004			2005			2006			2007			2008			2009		
			Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total	Initial System	Operating Costs	Total			
1	Favorable	WV101359		347,087	347,087		347,087	347,087		347,087	347,087		347,087	347,087		347,087	347,087		347,087	347,087		347,087	
2	Adverse	WV101359		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	
3	Adverse	WV101359		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	
1	Adverse	WV00952		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	98,171		98,171	
78			0	7,893,229	7,893,229	0	7,893,229	7,893,229	0	7,893,229	7,893,229	0	7,893,229	7,893,229	0	7,893,229	7,893,229	0	7,893,229	7,893,229	0	7,893,229	
	Issues		0	2,011,774	2,011,774	0	2,011,774	2,011,774	0	2,011,774	2,011,774	0	2,011,774	2,011,774	0	2,011,774	2,011,774	0	2,011,774	2,011,774	0	2,011,774	
	net of tax		0	5,971,455	5,971,455	0	5,971,455	5,971,455	0	5,971,455	5,971,455	0	5,971,455	5,971,455	0	5,971,455	5,971,455	0	5,971,455	5,971,455	0	5,971,455	

Gross

Line	No.	Description	Initial System	2009		2010		2011		2012		2013		2014		2015		2016		2017	
				Operating Costs	Total	Operating Costs	Total	Operating Costs	Total	Operating Costs	Total	Operating Costs	Total	Operating Costs	Total	Operating Costs	Total	Operating Costs	Total	Operating Costs	Total
1		Favorable	WV101359	347,007	347,007	347,007	347,007	347,007	347,007	347,007	347,007	347,007	347,007	347,007	347,007	347,007	347,007	347,007	347,007	347,007	347,007
2		Adverse	WV101359	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171
3		Adverse	WV101359	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171
4		Adverse	WV000652	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171	90,171
78				7,893,229	7,893,229	7,893,229	7,893,229	7,893,229	7,893,229	7,893,229	7,893,229	7,893,229	7,893,229	7,893,229	7,893,229	7,893,229	7,893,229	7,893,229	7,893,229	7,893,229	7,893,229
		Less:		2,011,774	2,011,774	2,011,774	2,011,774	2,011,774	2,011,774	2,011,774	2,011,774	2,011,774	2,011,774	2,011,774	2,011,774	2,011,774	2,011,774	2,011,774	2,011,774	2,011,774	2,011,774
		net of tax		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				5,871,455	5,871,455	5,871,455	5,871,455	5,871,455	5,871,455	5,871,455	5,871,455	5,871,455	5,871,455	5,871,455	5,871,455	5,871,455	5,871,455	5,871,455	5,871,455	5,871,455	5,871,455

Gross

Pay No Condition Permit No. District	2007		2008	
	Initial System	Operating Costs	Initial System	Operating Costs
1 Favorable WV101359	1	347,087	347,087	347,087
Adverse WV101359	2	98,171	98,171	98,171
Adverse WV101359	3	98,171	98,171	98,171
Adverse WV009652	1	98,171	98,171	98,171
	78	7,983,229	7,983,229	7,983,229
taxes		2,011,274	2,011,274	2,011,274
net of tax		0	0	5,971,455
		0	5,971,455	5,971,455

Gross

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TABLE 2

SELENIUM TREATMENT SYSTEM CAPITAL COST  
MAGNUM OPERATIONS

FAVORABLE									
Company	Permit No.	Outlet No.	Date Completed	Materials/Supplies	Site Prep	Power	No. of Tanks	Total w/power & site prep	Total w/o power & site prep
Catenary	WV1014684	3	28-Mar-09	22,830	6,000	0	1	28,830	22,830
	WV0096962	55	23-Jan-09	78,967	104,415	0	4	183,382	78,967
	WV0093751	5	5-Jun-09	78,967	15,583	0	4	94,550	78,967
Apogee	WV1013599	1	9/30/2008	315,230	129,663	0	21	444,893	315,230
	WV0099520	1	10/10/2008	126,000	10,000	0	6	136,000	126,000
Hobel	WV1016776	50	26-Mar-09	123,421	10,000	17,080	6	150,507	123,421
	WV1016776	1	16-Mar-09	126,719	10,000	5,149	6	151,874	126,719
	WV1016776	2	18-Aug-08	108,486	20,378	0	6	128,864	108,486
<b>Total</b>				<b>980,620</b>	<b>306,039</b>	<b>22,229</b>	<b>54</b>	<b>1,308,906</b>	<b>980,620</b>
<b>Avg/ Installation</b>							<b>7</b>	<b>163,613</b>	<b>122,580</b>
<b>Avg/Tank</b>								<b>24,239</b>	<b>18,160</b>

Avg Cost for 6-Tank Base System w/o power & site prep 108,960  
 Add-on for Site Prep (per system) 104,415  
 Add-on for Power (per system) 22,229  
 Total Avg Base System Cost 235,604

ADVERSE									
Company	Permit No.	Outlet No.	Date Completed	Materials/Supplies	Site Prep	Power	No. of Tanks	Total w/power & site prep	Total w/o power & site prep
Catenary	WV1014684	3	28-Mar-09	22,830	12,000	0	1	34,830	22,830
	WV0096962	55	23-Jan-09	78,967	208,830	0	4	287,797	78,967
	WV0093751	5	5-Jun-09	78,967	31,166	0	4	110,133	78,967
Apogee	WV1013599	1		315,230	259,326	0	21	574,556	315,230
	WV0099520	1		126,000	20,000	0	6	146,000	126,000
Hobel	WV1016776	50		123,421	20,000	68,320	6	211,741	123,421
	WV1016776	1		126,719	20,000	20,597	6	167,316	126,719
	WV1016776	2		108,486	40,757	0	6	149,242	108,486
<b>Total</b>				<b>980,620</b>	<b>612,079</b>	<b>88,917</b>	<b>54</b>	<b>1,681,615</b>	<b>980,620</b>
<b>Avg/ Installation</b>							<b>7</b>	<b>210,202</b>	<b>122,577</b>
<b>Avg/Tank</b>								<b>31,141</b>	<b>18,160</b>

Avg Cost for 6-Tank Base System w/o power & site prep 108,958  
 Add-on for Site Prep (per system) 208,830  
 Add-on for Power (per system) 88,917  
 Total Avg Base System Cost 406,705

**TABLE 3****OPERATING COSTS  
MAGNUM OPERATIONS**

Flow Rate Per Treatment Train	12	
Tanks Per Treatment Train	3	
Effective GPM Per Tank	4	
Media Cost Per Tank	7,000	
Recharges Tank Per Year	2	
Monitoring, Lab, Parts, Repair Per Tank Per Year	2,528	
<b>Operating Cost Per Year Per Tank</b>	<b>16,528</b>	
<b>Operating Cost Per Year Per GPM</b>	<b>4,132</b>	
<b>Operating Cost Per Month Per Tank</b>	<b>1,377</b>	6-Tank Base System
<b>Operating Cost Per Month Per GPM</b>	<b>344</b>	8,264
Hobet WV1016776 Outlet 002 Lab Analysis	12,642	10 mos.
Est annual cost per tank @ six tanks	2,528	